

Effect of Feeding Corn Hybrids Selected for Leafiness or Grain to Lactating Dairy Cattle

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Introduction

Corn silage is a valuable source of energy and fiber for lactating dairy cattle. Corn silage in dairy cattle diets has received more interest lately because of the shortage and high price of good quality alfalfa. There are many corn silage hybrids on the market that producers must choose from. However, little data exist which compare hybrids in side-by-side feeding and production trials. The general recommendation to producers has been to plant the highest grain yielding hybrid. Recently corn hybrids that possess traits specifically targeted for silage have entered the marketplace. Therefore, the objective of this study was to compare three divergent sources of corn hybrids used as corn silage in the diets of early lactation dairy cows and measure the production response of these animals.

Material and Methods

The three corn hybrids used in this study were a hybrid that has been selected for silage yield and leafiness (L), a high-grain yielding hybrid in the west central region of Minnesota (G), and a blended combination of various hybrids (B) which was selected because it was the lowest priced seed corn that could be purchased in this area in 1996. Corn was planted in May of 1996 according to specifications for each variety. Corn was chopped for ensiling between September 12 and 14, 1996. The theoretical length of chop for the corn at harvest was .635 cm. Varieties were ensiled in silage bags and allowed to ferment for 14 d prior to opening. Prior to harvest, four representative corn plants were collected from each hybrid for dissection and evaluation of specific plant parts. The three silage hybrids were fed to a group of early lactation dairy cows. Sixty-two Holstein cows (39 primiparous and 23 multiparous) were used in this experiment. Cattle were housed in a tie-stall barn at the West Central Experiment Station in Morris, MN. Cows were placed on their dietary treatment 3 d after calving and remained on the diet for 154 days. Diets

were formulated to contain 40.6 % corn silage, 10.2 % alfalfa haylage, 23.5 % corn grain, 7.4 % whole fuzzy cottonseed, 7.2 % soybean meal (48% protein), 5.3 % dried distiller's grains, 1.3 % blood meal, and 4.5 % vitamin and mineral supplement on a dry matter (DM) basis.

Results and Discussion

Silage yields were 13.79, 14.93, and 14.48 metric tons of DM/ha for the G, L, and B hybrids, respectively. Dry matter, nutrient content, *in vitro* digestibility, and proportion of each of the dissected plant parts for the three corn hybrids are shown in Table 1. Nutrient content of dissected plant parts exhibited similar trends for all three hybrids. The most pronounced nutrient differences were in the stalk, sheath, and tassel. In this fraction, the B hybrid was highest in NDF and ADF content, and lowest in IVDMD and IVNDF value. The IVDMD content differed by over 14.3 percentage units between the B and G hybrid and the IVNDF content differed by over 14.7 percentage units between the B and L hybrid. Leaf IVNDF was highest in the L hybrid and was over 8.0 percentage units higher than the G hybrid. Average DM and nutrient content, and *in vitro* digestibility of the three silage hybrids during the trial are shown in Table 2. Daily DM and nutrient intakes did not differ among diets (Table 2). Average daily milk, 3.5 % fat corrected milk, fat, and protein production did not differ across dietary treatments.

Conclusion

The three corn hybrids evaluated for silage were different in their chemical composition and *in vitro* digestibility. However, these differences did not affect feed intake, milk production, or milk composition of lactating dairy cows. It appears that in properly formulated dairy diets, differences in corn silage composition must be greater than those observed in this trial in order to affect cow performance.

Table 1. Average dry matter (DM) content, nutrient composition¹, digestibility, and percent of various plant parts for three corn hybrids.

Plant Part	DM	CP	NDF	ADF	IVDMD	IVNDF	% of Plant
%	----- % DM -----						
Husk, Silk and Shank							
L	30.0	3.1	73.5	33.9	57.9	45.0	6.8
G	31.5	3.8	76.7	38.0	50.8	51.2	7.0
B	33.9	4.1	76.1	37.9	52.0	50.6	8.1
Stalk, Sheath and Tassel							
L	24.7	2.5	69.1	40.8	47.8	42.3	30.4
G	22.9	1.9	69.1	40.8	52.3	32.7	29.5
B	24.4	2.3	75.2	45.6	38.0	27.5	24.7
Cob							
L	47.2 ²	1.8	80.5	38.7	47.5	30.0	8.9
G	52.1 ²	1.7	85.7	43.8	44.5	35.5	7.9
B	54.9 ²	1.5	85.6	44.7	44.6	33.6	11.0
Grain							
L	—	9.1	12.8	2.4	88.7	44.9	41.0
G	—	9.2	11.7	2.1	93.5	48.5	43.7
B	—	8.4	12.8	3.1	86.6	43.1	46.2
Leaves							
L	28.9	10.0	57.1	30.9	63.1	53.7	13.0
G	25.4	10.2	56.4	30.2	58.2	45.7	11.9
B	24.9	10.6	57.8	30.8	60.1	48.5	10.1

¹CP (crude protein), NDF (neutral detergent fiber), ADF (acid detergent fiber), IVDMD (in vitro dry matter disappearance), and IVNDF (in vitro NDF digestibility).

²DM value includes cob and grain.

Table 2. Silage nutrient measures and cow performance.

Item	L	G	B
<u>Silage</u>			
DM, %	34.6	36.7	38.7
	----- % DM -----		
CP	6.9	7.0	7.3
NDF	45.6	43.7	45.1
ADF	24.3	23.6	24.4
IVDMD	69.2	66.8	66.7
IVNDF	38.0	34.6	34.4
<u>Cow Performance</u>			
	----- kg/d -----		
DM Intake	22.4	22.3	21.8
Milk	35.2	35.1	36.3